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This report discusses the use of cocaine throughout history; the introduction of crack cocaine in the early 1980s; its use by pregnant women; and the resulting impact on their infants, including premature births, deformities, and impaired neurological functioning. Studies which show that the neurological impairments continue into at least early childhood are reviewed, and statistics on the extent of the problem are cited. Programs instituted to facilitate the enrichment and development of cocaine-exposed babies and children are described. Recommendations are offered to teachers who have cocaine-exposed children in their classrooms, and suggestions are made on dealing with the problem of the poor home environment and inadequate parenting often suffered by these children. (62 references) (JDD)

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Effects of Fetal Cocaine Exposure and Implications For Teachers of Exposed Children

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November 28, 1990

Submitted in Partial Fulfillment
of the Master's Degree in
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ABSTRACT

Effects of Fetal Cocaine Exposure
and Implications
For Teachers of Exposed Children

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Although cocaine has been used in various forms for at least 1200 years, the introduction of crack cocaine in the early 1980's resulted in an epidemic of cocaine use in the United States. Although this epidemic has spread across all cultural and economic lines, it is viewed largely as a problem of the poor and minority populations. Cocaine use by pregnant women has been found to affect their infants, resulting in premature births, deformities, and impaired neurological functioning. This impairment in neurological functioning would appear to be the most serious effect of maternal cocaine use. Although the children affected by their mother's use of crack have not yet grown old enough for definitive findings on their ultimate functioning, current studies have shown that the impairment continues into at least early childhood. Several hospitals have instituted programs to facilitate the enrichment and development of these cocaine-exposed babies, and some communities have created preschool programs to help these children prepare for entry into the public school system. While no program has yet presented a "cure" for the impaired motor and behavioral functioning of these children, several methods of helping them tolerate stimulation and make social adjustments have been developed. Recommendations to teachers who may find these children in their classrooms are made, and several suggestions on dealing with the problem of the poor home environment and inadequate parenting often suffered by these children are reviewed. These children are going to require a public commitment to provide them with early remediation and special education.

EFFECTS OF FETAL COCAINE EXPOSURE
AND IMPLICATIONS
FOR TEACHERS OF EXPOSED CHILDREN

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INTRODUCTION

Cocaine is a white, powdery substance which can be ingested through the mucous membranes (usually of the nose), injected intravenously, eaten, or inhaled in smoke. Cocaine acts as a local anesthetic and as a central nervous system stimulant, and cocaine ingestion results in a hyper-aroused state. Cocaine produces this hyper-aroused state by triggering the release of chemicals called neurotransmitters, through which the nerve cells of the brain communicate with each other. Release of these neurotransmitters causes feelings of euphoria, confidence, and energy, increases heart rate and blood pressure, dilates pupils, constricts peripheral blood vessels, and raises body temperature and metabolic rate. Unfortunately, when the drug wears off, twenty to forty minutes later, the feelings are not good - irritability, impatience and pessimism occur and are often accompanied by a headache. These bad feelings come about because, although normally the released chemicals are returned to the nerve cells to be used again when needed, cocaine blocks the return. After repeated doses of cocaine, the nerve cells do not contain any more neurotransmitters to release, and additional cocaine use then only aggravates the deficiency.

Although cocaine has long been believed to be non-addictive, it produces characteristics of drug addiction which

include a powerful psychic dependence and a strong tendency to continue cocaine administration. Whether cocaine results in a true physical addiction is held to be debatable, because cocaine does not produce the clearcut withdrawal symptoms seen with the recognizedly addictive drugs. Instead, the neurochemical changes which cocaine induces in the brain apparently cause physical and psychological alterations and eventually produce an intense desire for cocaine which would appear to be addiction.

Cocaine use could sarcastically be said to be a natural outgrowth of American tradition, as Americans have long valued what the use of cocaine initially produces - energy, initiative, and optimism. The exhaustion, paranoia, and violence which follow cocaine use could also unfortunately now be said to have become an American tradition. Cocaine is an American drug - it is derived from a shrub which grows naturally in mountainous uplands of South America and is also cultivated in Mexico, the West Indies, and Java. The leaves of this plant, which are small, are collected at harvesting time and initially processed by soaking with kerosene and other solvents. There is evidence that the harvesting and ingestion of cocaine has been going on in South America for at least 1,200 years. Although no written language existed and there are subsequently no written records, mummy bundles which contain coca leaves have been found in Peru, as have shards of ceramic pottery with depictions of coca leaves and faces with their cheeks stuffed with these leaves. The

Indians ingested the coca leaves through chewing them, mixing the leaves with lime to release the alkaloid and bonding the mixture with cornstarch or bird droppings. Coca leaves were an important part of their religion, and the coca plant was said to be divine and a gift of the Royal Son of the Sun God to the Inca Empire. No apparent harm results from chewing coca leaves.

In the 16th Century, the Spanish conquistadors destroyed the Inca civilization. At first, the Spanish conquerors forbid the chewing of coca leaves, but then they discovered that chewing the leaves enabled the Indians to need less food and sleep while working in the Spaniards' mines. Phillip II of Spain declared the coca habit essential to the health of the Indian, and the Spaniards took to paying the Indian workers with coca leaves. The Spanish did not take note of something which could have been valuable to western society at that point in time - cocaine is the only naturally-occurring local anesthetic, and there is apparently a great deal of evidence that the Incas used the coca leaves as a local anesthetic during trephining operations (opening holes in the skull). These operations were considered too risky until the end of the 19th Century by western surgeons because of the lack of appropriate anesthesia.

In 1855, a German chemist, Fredrich Gaedecke, extracted the active ingredient from coca leaves, which he named "erythroxyline." In 1859, another German, Albert Niemann, isolated the

compound and named it "cocaine," while an Italian physician, Paolo Mantegazza, announced his finding that coca leaves were going to be a very important weapon against disease. The drug met with a mixed response in England but was welcomed by American physicians, who claimed it was efficacious against an incredible range of ills. A German physician, Dr. Theodor Aschenbrandt, reportedly issued cocaine to Bavarian soldiers in 1883 and announced that it greatly enhanced their ability to endure fatigue. Further medical encouragement of cocaine use followed. In 1884, Merck laboratories made a shipment of cocaine to Dr. Sigmund Freud, who wished to experiment with it upon himself and upon a friend and colleague who was an opiate addict. The effects of cocaine fascinated Freud, and he wrote extensively about the drug and his self-experimentation. He suggested and predicted many possible therapeutic values of cocaine (a stimulant, an aphrodisiac, a treatment for depression, gastrointestinal disturbances, wasting diseases, alcoholism, morphine addiction, and asthma), but produced no supporting scientific research. He reportedly even sent cocaine to his fiancee to enliven her. Freud apparently became aware of the addictive nature of cocaine and ceased exhorting others to utilize it. He deleted all mention of his cocaine usage from his autobiography, but the medical community did not forget and Freud was later castigated during a medical meeting as being irresponsible and the primary cause of cocaine abuse.

Other physicians had proceeded with the use of cocaine as a topical anesthetic, particularly for eye surgery, which usage met with great approval among opthamalogists and allowed development of new surgical techniques. Cocaine continued to be used for many ailments, including tuberculosis. Cocaine was used at Johns Hopkins for nerve blocks and opened the way for development of general surgical anesthesia. Unfortunately, many of the physicians who used cocaine for their patients also used it themselves and then had to battle their habituation. This cocaine abuse was chronicled in the Sherlock Holmes novels. Although Sherlock ultimately regained his health and composure in 1894, replacing his cocaine habit with a pipe, the public took no note - they followed the physicians in making use of cocaine for their own enjoyment. From the 1890's to 1914, many products were produced for public sale which contained cocaine, among them Coca-Cola and many other cocaine beverages. Cocaine was said to be useful in curing opiate or alcohol addiction, and products were sold to accomplish these ends.

The United States passed the Pure Food and Drug Act in 1906 to provide more acccurate product labeling of medications. This did not have too much success with diminishing cocaine abuse, but the Harrison Tax Act of 1914 labeled cocaine a narcotic and drove cocaine to underground use. The result of this was that an illicit market was created and there was no longer any government control over the sale of cocaine or its quality.

By the 1920's, cocaine had become a counter-culture drug and was most often used by jazz musicians, bohemians, and ghetto residents. Use of cocaine gradually lessened. In the late 1950's, there were said to be only about 50,000 cocaine users in the United States, and little was heard by the public about cocaine during the 50's and 60's.

In the early 1970's, renewed popularity of cocaine appeared among the well-to-do and people involved in arts, particularly music and entertainment. By 1978, although the only recognized medical use for cocaine was as a topical anesthetic for eye, ear, nose, and throat surgery and in endoscopy of the upper respiratory and digestive tracts, cocaine was said to be gaining popularity rapidly - in fact, faster than any other drug. The public began taking notice of the problem on an ever-increasing scale, but many writers did not believe that cocaine was a serious problem. The government appeared unconcerned, and even the President's drug adviser wrote in the mid-1970's that cocaine was "probably the most benign of illicit drugs currently in widespread use" (Holden, 1989). Many reports in the late 1970's found no serious problems with cocaine use. In 1977, a report on recreational use of cocaine by R. K. Seigel found no harm with cocaine use of less than two or three times a week (Grinspoon and Bakalar, c.1978). In fact, Drs. Grinspoon and Bakalar of the Department of Psychiatry at the Harvard Medical School and Massachusetts Mental Health Center, reported in 1978

that studies of recreational cocaine use did not indicate many undesired effects of a serious nature. Usually, the most undesirable side effect listed was the feeling of irritability which existed after the drug-induced euphoria subsided. Drs. Grinspoon and Bakalar stated that, in fact, even this irritability was not really a problem in that the reports of increased aggressive behavior were not borne out by any evidence.

Studies done on possible death resulting from cocaine use were generally negative, finding such deaths rare and when reported, to be caused by massive oral ingestion or intravenous injection. Researchers did note that there was a need for caution but added that people familiar with cocaine were aware of this. Numerous experiments with animals, such as monkeys, showed that they would quickly kill themselves if allowed unlimited access to injections of cocaine; nevertheless, as of 1978, researchers concluded that although their studies and observations showed a real potential for cocaine abuse, the present level of use did not concern them. This attitude was generally held by the medical profession and the public - cocaine was a trendy substance and was often used as a subject for comedy. Perhaps the long history of shock and scare tactics which had been used to discourage use of marijuana had created a feeling that recreational drugs really couldn't harm people and that any negative reports were the result of society, for

Puritan reasons, spreading rumors of harmful effects from cocaine use in order to keep people from "having fun."

Cocaine had long been sold as a powder of the hydrochloric (HCL) salt - this white powder of cocaine HCL diluted with inert substances was usually known in street jargon as "coke." When inhaled or "snorted" intranasally, it takes a while to build up a high level in the blood because the drug constricts the blood vessels in the nose. In the early 1980's, new methods of processing and using cocaine appeared which made the cocaine abuse situation more serious - the introduction of a ready-made smokeable cocaine - "crack." Crack is a form of cocaine which is prepared by mixing ordinary cocaine with baking soda and water and then heating the mixture in a pot, afterwards drying it and breaking it into tiny chunks which can be smoked in glass pipes, with cigarettes, or with marijuana. Crack is absorbed rapidly through the lungs, reaching the brain within seconds in a concentrated form. Although cocaine had been smoked by "free-basing" before the crack epidemic, the users had to make their smokable mixture themselves, which was difficult and dangerous. The new preparation came ready to use. Whereas "coke" was diluted with inert substances, produced effects in 1 to 3 minutes, and lasted 20 to 30 minutes, "crack" comes as almost pure cocaine, reaches the brain within seconds, and lasts 5 to 7 minutes. The shorter "high" is more intense and the resulting depression is deeper, resulting in crack being extremely

addictive. To further the disaster, this new "crack" was easy to make, easy to transport, and relatively inexpensive to buy. Cocaine had for years been an expensive drug used mainly by affluent people, but now crack cocaine was also available to the disadvantaged, and they became highly visible users.

This paper will deal with the effects of the crack cocaine epidemic on the children born to cocaine users. It will review current studies on these children and statistics on the extent of the problem and how many children are being affected, explore the problems which are surfacing and the developing methods to assist affected infants and children, and make recommendations to future teachers of these children. These findings and recommendations should be of assistance to those in the field of education in becoming better prepared to help and understand these children when they enter our classrooms.

CHAPTER TWO
INTRAUTERINE COCAINE EXPOSURE: FINDINGS

The introduction of crack cocaine in the early 1980's resulted in greatly increased cocaine use. There had long been argument about whether cocaine was an addictive substance, but it was generally accepted that, although physical dependence could not be proven, use of cocaine fostered a compulsion to use the substance and that this compulsion became the most important thing in a cocaine user's life. As Dr. Jeffrey Rosecan of New York City's Columbia Presbyterian Medical Center said, "If anyone had doubts as to whether cocaine is physically addicting, all he has to do is look at a couple of crack users" (Lamar, 1986). Where it had taken three to four years to develop an addiction to coke, the addiction to crack takes only an estimated six to ten weeks (Lamar, 1986).

Heavy users of cocaine had been notoriously unconcerned about the needs of their families and had stolen from family, friends, and employers in order to continue their drug use when they had exhausted their own funds. Because crack cocaine was heavily used by the economically disadvantaged and was even more addictive than "coke," the users increasingly turned to crime and prostitution to get the money needed to continue their use. Police began noticing a rising rate of burglaries and armed robberies in areas where crack is sold. In New York City, the

police began reporting brutal crimes and homicides which they attributed to the violent mentality produced by crack use (Lamar, 1986). The environments in which the poor lived grew worse - now the residents did not only have to contend with poverty, they had to live with crime and danger. The children in poor neighborhoods, always having had the probability of poor role models in their lives, now had neighborhoods filled with criminals, drug addicts, and prostitutes. In addition, these children were often recruited as cocaine distributors.

While the "upperclass" cocaine epidemic had often been treated as humorous, the crack epidemic, primarily among the "lowerclass," didn't seem to have any amusing aspects. In 1986, the National Institute on Drug Abuse reported that, for the first time in the 15 years it had collected data, cocaine surpassed all other causes of drug-related emergency room visits, topping even ethanol and narcotics (Shannon et al, 1989).

Society had become aware that the use of cocaine, particularly crack cocaine, was resulting in drug-related crime, loss of productivity, and destruction of home environments, but until 1983, no particular interest appears to have been taken of cocaine's effects on pregnancy. Medical literature supported the theory that cocaine use by pregnant women had little or no effect on the fetus (Pal Beach Post, 1986), and even in 1982, there were still textbooks on high-risk obstetrics which reported there were no harmful effects on a fetus from cocaine use (Revkin, 1989).

Cocaine at this point was not considered a teratogenic drug. A teratogenic drug is any chemical which can produce birth deformities. If such a drug is taken during the first 20 days of pregnancy, it will either kill the embryo or not affect it at all; and if taken from the third to the eighth week, it can do the greatest possible harm to normal embryonic development, as this is when the organs are forming. After this period, teratogenic drugs don't usually cause major defects but can affect growth and organ function. The nervous system, however, remains vulnerable to teratogenic drugs because it continues to develop throughout the pregnancy and infancy (Zamula, 1989).

Pregnant women had long believed that the placenta would protect an unborn baby from any toxic substances ingested by the mother, but in fact the placenta is no such barrier to toxic drugs (Schneider and Chasnoff, 1987; Smith, 1988). Cocaine is of low molecular weight and easily transported across the placenta; in addition it is readily soluble in fats and water (Coustan and Carr, 1990), and the developing fetus' central nervous system is almost all fat (Breu, 1986). Worse yet, fetal livers and kidneys are immature and metabolize and excrete drugs very slowly, so that drugs remain longer in the fetus' system than they do in the mother's (Schneider and Chasnoff, 1987).

In 1983, Acker and coauthors reported two cases of abruptio placentae occurring within a few hours after pregnant mothers

took cocaine, one by needle and the other by "snorting." Abruptio placentae occurs when the placenta tears away from the lining of the uterus, causing early labor. Additional cases of abruptio placentae were reported over the next few years, and the possibility of a real association between cocaine use and fetal loss was recognized (Coustan and Carr, 1990). The fetal misadventures noticed beginning in 1983 had resulted from "coke" usage. The onslaught of crack cocaine use which began in 1985 resulted in increased reportings of maternal cocaine use for many reasons, including increased cocaine use among pregnant women of lower socioeconomic class, who are more likely to be suspected of and questioned about their drug use than upper or middle class pregnant women. Also, because "crack" quickly raises blood cocaine levels and has such a short-lived effect, leading to a desire to ingest more and more of the drug, the effects on the fetus tended to be more severe and readily observed with crack than with other forms of cocaine, particularly considering the fact that the fetus has reduced ability to metabolize and excrete the drug, so that it actually accumulates in its body (Coustan and Carr, 1990).

The rapidly growing number of cocaine-affected pregnancies caught health care providers by surprise (Smith, 1988). While it could not be argued that cocaine abuse was taking place among an ever-increasing number of pregnant women, the actual effects of this abuse on the fetuses were argued. Cocaine had

previously been believed to be innocuous. Reports started surfacing during the early 1980's that serious fetal damage was occurring from cocaine use by pregnant women (Langone, 1988), but these were anecdotal reports, and accurate data had not been presented (Giacoia, 1990). Ira J. Chasnoff, a pediatrician, and others at Northwestern University in Chicago, presented the first study of the effects of cocaine on pregnancy in 1985. Dr. Chasnoff had worked for some years with substance-abusing mothers and had found that the number of cocaine-using women presenting at the facility had been increasing rapidly. In examining the infants of these women, the authors in this study discovered no interference with intrauterine growth, but found that the infants were at risk for congenital malformations and perinatal mortality. In testing the infants on the Brazelton Neonatal Behavioral Assessment Scale, they found tremulousness, poor state control (organizational response to environmental stimuli), and depressed interactive abilities (Chasnoff et al, 1985). The researchers announced that long-term follow-up of these infants would be done to determine whether the neonatal neurobehavior observed was permanent. In a 1987 report, Dr. Chasnoff stated that these newborns exhibited irritability, poor feeding patterns, high respiratory and heart rates, increased tremulousness and startles, and irregular sleeping patterns (Schneider and Chasnoff, 1987). Subsequently, Dr. Chasnoff announced his findings that these cocaine-exposed infants were

exhibiting "their own unique set of problems" and neurobehavioral changes which he felt were possibly severe (Chasnoff, 1988).

Much controversy existed over the presence of a cocaine withdrawal syndrome. The majority of the literature and numerous clinicians working with infants born to cocaine-abusing women supported the existence of a withdrawal syndrome (Schneider and Chasnoff, 1987), but this was complicated by the fact that this withdrawal syndrome was unfamiliar and most researchers found that, unlike opiate-exposed neonates, cocaine-exposed infants did not seem to experience the "classic neonatal abstinence syndrome" (Smith, 1988). In a report on 8 infants exposed to cocaine intrauterinally who were born at the University of California Irvine Medical Center, only one infant had any of the signs of ordinary neonatal drug withdrawal and these symptoms went away without therapy and were not believed to be caused by withdrawal. The authors concluded that withdrawal from cocaine did not appear to be a major problem with cocaine-exposed infants, finding that their observations indicated that intrauterine cocaine exposure was not life-threatening. They felt that this was comforting and suggested that no management strategies were going to be necessary in the initial care of these infants (Madden et al, 1986).

The controversy continued over whether a withdrawal syndrome existed among these cocaine-exposed infants. In a

1988 report, Dr. Chasnoff stated that "it is not yet fully understood whether the irritability and tremulousness found in cocaine-exposed infants is a syndrome due to withdrawal from the drug or a direct effect of cocaine on the CNS of the infant."

Seizures have frequently been seen in infants exposed neonatally to cocaine. Of 16 patients who were prenatally exposed to cocaine, seen in a pediatric neurology clinic during 1986 and 1987, it was found that only one patient had a cerebral infarction thought secondary to maternal cocaine abuse which was the likely cause of the seizures. The researchers were unable to determine the mechanisms which were provoking the seizures in the remaining 15 patients who did not have such "focal CT lesions." They felt that a permanent change in "cerebral mechanisms" might be the cause of the continued seizures experienced by these patients and that a further study was needed to "clarify the degree of long-term potential for the induction of epilepsy by cocaine" (Kramer et al, 1990).

Other than these strokes and seizures, many physicians were noting the greatly increased risk of sudden infant death syndrome in these infants of cocaine-abusing mothers, perhaps as high as 15% (Chasnoff, 1988; Chasnoff et al, 1985; Ryan et al, 1987; Smith, 1988). One result of cocaine exposure was noted regularly - intrauterine growth retardation, with accompanying smaller head circumference (Chasnoff,1988; Chasnoff et al, 1989; Coustan and Carr, 1990; Langone, 1986; Little et al, 1989;

MacGregor et al, 1987; Silverman, 1989). Dr. Chasnoff found that the average reduction of head circumference in infants exposed throughout gestation was 3/4" (Chasnoff et al, 1989). Reports of dismorphologic findings were rare (New York Times, 1986; Washington Post, 1986) and, in this author's opinion, might not have appeared at all except for the fact that many cocaine-abusers also abuse alcohol and other drugs, which could confuse the issue as to which substance was responsible for the dismorphology. The majority of physically observable effects of maternal cocaine abuse were determined to consist of low birth weight, shorter length, growth retardation, strokes and seizures, smaller heads (microcephaly), cardiac arythmias, cardiac failure, malformed hearts, abnormal EEG's, genito-urinary tract malformations, loss of the small intestine, and neural tube defects (Giacoia, 1990; Langone, 1988; Westchester Task Force, 1989). In a study performed in Texas in 1987 by Little and others, 53 infants born to mothers who reported abusing cocaine during the first trimester of their pregnancies were compared with a control group of 50 infants from a comparable population. The researchers found that the cocaine-exposed infants had increased frequency of congenital anomalies, preterm birth, and a significantly lower mean birth weight than the controls but that this difference was not as significant as other investigators had found. Although the cocaine-exposed infants had more reporting of Apgar scores of 6 or less at 1

minute, this was not reported at 5 minutes (Little et al, 1989). The findings on consequences of fetal cocaine exposure were considered ambiguous (Smith, 1988). Another study of cocaine-exposed infants at Beth Israel Medical Center in New York City, found "temporary central nervous system irritability" in the majority of the infants and "apparently related abnormal brain wave patterns" in one-half of these (Silverman, 1989). These effects were reported to dissipate after birth. The researchers noted that undetected long-term damage might exist but that the impact of cocaine on the brain was not yet known. It was generally concluded that not enough was yet known about the potential adverse health outcomes associated with cocaine use during pregnancy (Little et al, 1989).

Dr. Scott MacGregor and others analyzed 70 pregnancies complicated by cocaine abuse and other addictive substances and compared these with the pregnancies of matched obstetric patients without substance abuse histories. They found that the mean gestational age at delivery was lower in the cocaine-exposed infants, the proportion of infants born before term was higher in the cocaine-exposed infants, and the mean birth weight was significantly less. They found that their study data supported the hypothesis that cocaine use might "adversely affect perinatal outcome" (MacGregor et al, 1987).

One of the main problems in studying the effect of maternal cocaine abuse on fetuses has been the fact that drug users often

abuse several different drugs (MacGregor et al, 1987). A popular combination, for example, is alcohol, cocaine, and marijuana (Silverman, 1989). Due to the relative dearth of reliable information which isolated the effect of prenatal exposure to cocaine, a study published in 1987 was performed in Philadelphia at Jefferson University Medical Hospital within an outpatient health care program for drug-dependent pregnant women. The infants of cocaine using mothers were compared with those of drug dependent but cocaine free mothers and with those of non-drug dependent women in the hospital's regular obstetrical clinic. The study suggested that cocaine exposed infants have even poorer outcomes than those exposed to other drugs such as methadone. The authors found that the complications previously associated with cocaine abuse (fetal death, decreased birth weight, length, head circumference, and Apgar scores, and possible greater incidence of sudden infant death syndrome) could indeed be attributed to the cocaine exposure rather than to exposure to the other drugs (Ryan et al, 1987).

In probably the most important study done to date, by Dr. Chasnoff and co-workers at Northwestern University Hospital, women who had used cocaine during their pregnancies were followed from 1986 to 1988 to evaluate the effect of first-trimester cocaine use versus use throughout pregnancy. One group consisted of 23 women who had attained abstinence from cocaine by the end of the first trimester; a second group

contained 52 women who continued to use cocaine throughout their pregnancies; and a control group of 40 women was selected from the general obstetric population at the same hospital, with group matching on the basis of maternal ages, socioeconomic class, and tobacco use. The infants of both groups of cocaine-abusing women were found to be subject to premature delivery, abruptio placentae, loss of small intestine, genitourinary tract abnormalities, and significant impairment in the areas of orientation, motor ability, normal reflexes, and state regulation. Other than gestational age and intrauterine growth, none of the obstetric or neonatal outcomes reported were significantly affected by the amount, frequency, or route of cocaine use. Although the infants whose mothers stopped their cocaine use by the end of the first trimester had a slightly higher mean gestational age than and did not demonstrate the deficiencies in intrauterine growth exhibited by the infants of mothers who used cocaine throughout the pregnancy, other effects of cocaine exposure routinely appeared in both groups (Chasnoff et al, 1989). This was a surprise, as much work had been recently done on fetal exposure to alcohol, and findings had been very encouraging regarding decreased fetal affect with abstention during the latter part of the pregnancy (Anderson and Grant, 1984; Rosett and Weiner, 1985). The researchers found that "the neurobehavioral response deficiencies occur in the cocaine-exposed infant whether the mother stops cocaine use in the first

trimester or uses cocaine thoughout the pregnancy" (Chasnoff et al, 1989). While there is anecdotal reference to long-term cocaine abusing mothers giving up the drug toward the end of pregnancy and delivering normal appearing, healthy children (Smith, 1988), Dr. Chasnoff has found that almost no cocaine-exposed baby escapes some damaging effects and that merely one "hit" of cocaine can cause a stroke in the baby before or just before birth (Fackelmann, 1989; New York Times, 1988).

These findings have reportedly put physicians in a quandary, troubling them about what to tell women who used cocaine during the early weeks of pregnancy before they became aware that they were pregnant. Dr. Arnold Washton, the director of addiction research and treatment at Regent Hospital in Manhattan, reports that he tells these women to have an abortion, "because if you've used cocaine during the first trimester, you're playing Russian roulette" (New York Times, 1986). Other physicians, such as Dr. Jeffrey Rosecan of Columbia-Presbyterian Medical Center, feel that this could be an exaggeration and cause unnecessary abortions but that "at the same time, I don't think we should be too cavalier" (New York Times, 1986).

CHAPTER THREE
CURRENT STATISTICS ON COCAINE

As previously noted in this report, cocaine use gained popularity in the United States during the 1970's and was primarily used by the affluent and "hip," these users being mostly white. Cocaine was long considered the "champagne of drugs" - it was the glamorous drug for special occasions, and use of cocaine was considered "upperclass" (Gay et al, c.1973).

In 1981, a household survey by the New York State Division of Substance Abuse Services found that 5% of the state's residents over age 12 had used cocaine in their lifetimes, with 3% using it in the prior six months and 2% in the past 30 days, often in combination with alcohol or marijuana. This was found to be a "dramatic" increase from the last survey conducted 5 years prior. These cocaine users were typically found to be young white men who were employed full time and who frequently came from families within the higher income brackets. Males, as expected, had a strong tendency to be cocaine users, with 68% of all cocaine users being male while only 47% of the total population was male. Surprisingly, however, cocaine use was already found at this time to be "overrepresented" among blacks. In this 1981 survey, although blacks were only 13% of the total population, they comprised 20% of cocaine users.

The New York State Division of Substance Abuse report in 1981 also announced that cocaine emergency room deaths had increased to 518 in late 1981 from 162 in late 1978. Similar increases were reported across the country (Smith, 1984). While there had also been a steady increase in admissions due to cocaine abuse to state-funded treatment programs in New York, the increase between 1985 and 1986 was the most striking - an increase of 87%. This, of course, was a result of the introduction of crack cocaine in 1985 (N.Y.S. Division of Substance Abuse Services, 1987). Dr. Arnold Washton, who is the director of research for the National Cocaine Hotline, said he had never heard of crack in May 1985 but that by May 1986, the hotline was receiving between 700 and 900 calls a day from crack users (Lamar, 1986). In 1986, the National Institute of Drug Abuse reported that about 22 million Americans had used cocaine, with 6 million possibly being current cocaine users (Smith, 1988). The same year, the National Cocaine Hotline estimated that 1 million Americans in 25 states had already tried crack (Lamar, 1986).

While reliable records for cocaine use in the United States are not readily available, the New York area has been a forerunner of cocaine and crack abuse and can be considered a good indicator of use trends. In New York City as of 1987, blacks constituted the majority of cocaine abuse treatment admissions, followed by Hispanics and then by whites. In the rest of the

state, however, the majority of people admitted to treatment for cocaine abuse were white, followed by blacks and then by Hispanics (N.Y.S. Div. of Substance Abuse Services, 1987). This is probably due to demographics. Although the majority of treatment admissions for cocaine abuse in New York City have historically been male, females continued to be a growing segment until 1987, when their percentage of admissions began declining slightly. Interestingly, whereas in New York City the percentage of women abusing cocaine slightly declined from 1986 to 1987, in the rest of the state the percentage of women abusing cocaine slightly increased during this period (N.Y.S. Div. of Substance Abuse Services, 1987).

Cocaine was originally considered a "recreational drug," and it has been very popular for sexual enhancement (Smith, 1984). Sex results in pregnancy and pregnant women often don't know they are pregnant for some time. This use of cocaine as a sexual enhancer, in conjunction with the fact that cocaine has been proven to negatively affect fetal development even if only used in early pregnancy, has contributed no doubt to a good many cocaine-exposed fetuses. Regarding maternal use of cocaine, according to the New York City Department of Health, Bureau of Vital Statistics, in 1979, 11% of mothers indicated cocaine abuse. By 1985, 51% of mothers indicated cocaine use; and by 1987, more than 75% indicated cocaine use, particularly of crack (N.Y.S Div. of Substance Abuse Services, 1987). It is difficult

to obtain reliable statistics on maternal cocaine use because many hospitals do not screen for cocaine, and there is a lack of clear physical indications of cocaine use. Unlike other substance abuse, which results in obvious impaired functioning, cocaine addiction "can be concealed by demeanors from shy and secretive to outgoing and witty" (Smith, 1988). Also, while toxicologic urine screening will detect a newborn's exposure to cocaine for up to the past nine days because of the inability of the infant's immature liver to efficiently metabolize the drug, the same screening will only detect the mother's cocaine use during the past 24 hours (Smith, 1988). In a Florida neonatal intensive care unit, they found that the number of cocaine involved babies admitted went from 7% to 20% during early 1986 (Palm Beach Post, 1986). According to one survey, upwards of 11 percent of all U.S. infants in 1988 tested positive for cocaine or alcohol the first time their blood was drawn (Dorris, 1990). In 1989, many hospitals found that obvious cocaine and pregnancy complications such as abruptio placentae were being seen daily (Providence Journal Bulletin, 1989). Currently, it is being acknowledged that an increasing proportion of cocaine abusers are women of childbearing age (Giacoia, 1990), and the number of cocaine-exposed babies in the United States is estimated to be as high as 200,000 (Revkin, 1989).

As previously mentioned, these babies are often extremely premature, and there is a high cost to bring them to a normal

birth weight. The earlier a baby is born, the longer it needs intensive care, and at one hospital, the stated cost per day is from $1,500 to $2,000. A baby born eight weeks premature, which is not unusual with crack-exposed infants, will require two months of intensive care, which will cost more than $100,000. Not only has the crack epidemic resulted in extremely premature infants requiring intensive care, it has resulted in far more infant deaths. In Washington, D.C., where crack use has been endemic, the number of infants who died before their first birthdays rose to 32.3 deaths per 1,000 live births during the first half of 1989. The national average for such infant deaths was 9.9 deaths per 1,000 in 1988 (Rist, 1990).

Although cocaine had long been favored by middle-class and wealthy abusers, doctors have found that the majority of cocaine-affected babies are those of the poor (New York Times, 1986). This could be due to the fact that, even though white middle and upper class people were still using cocaine, they were not as likely to use crack cocaine, which exposes the fetus to heavier concentrations of the drug. Crack has developed as an innercity drug, not used as extensively in more suburban areas and not even being as popular in other big cities as it is in New York (N.Y.S. Div. of Substance Abuse Services, 1987). Some doctors who are seeing cocaine-affected infants assert that the babies of more affluent and better educated women are less likely to be cocaine-affected because their mothers have

historically been willing to stop smoking or drinking during pregnancy and are therefore more likely to understand the risk of cocaine abuse in pregnancy and to discontinue its use (New York Times, 1986). Dr. Lorraine Hale, executive director of Hale House in Harlem, a home for the children of addicts, feels that black women are more likely to abuse cocaine during pregnancy because, among blacks, cocaine has long been considered a "white" drug, while drugs such as heroin have been perceived as "black" drugs. The perception has been that because cocaine is a white drug, it can't be bad for you. Dr. Arnold Washton, director of addiction research and treatment at Regent Hospital in Manhattan, also stated that this perception exists, "That is part and parcel of the myth of this drug - that it is not addictive and not harmful to the body." He added, "The traditional assumption among women using cocaine is that it's short-acting and doesn't get to the fetus" (New York Times, 1986). In Okalahoma, out of 4430 drug-abusing women cared for by the State Department of Health in 1989, although only 11% of the group were black women, 52% of these were cocaine abusers. Of the remainder of the group, 77% were white women, with only 16% of these being cocaine abusers. 10% of the group were Indians, with only 11% of these being cocaine abusers (Giacoia, 1990).

Some physicians who see cocaine-exposed infants feel that the discrepancy in social class and ethnic group of reported affected babies is only due to unreliable reporting and that

crack reaches beyond the poor, minority population of the inner cities and is "an equal-opportunity drug." A National Association for Perinatal Research and Education study of pregnant women at both public and private obstetric clinics in Pinellas County, Florida, found "no signficant difference" between substance exposure rates in both populations. The reporters found that a minority woman was far more likely to be reported than was a white woman and felt that white middle-class cocaine using mothers "find it easier to hide their substance abuse than do poor, minority women" (Rist, 1990). Perhaps it appears that there is a greater problem of crack-exposed infants among lower socioeconomic groups because crack cocaine has only gradually been spreading from its original innercity minority group beginnings. In Wichita, Kanasas, for example, crack babies were not seen until about 1988, but their appearance is now "becoming more and more commonplace," with crack use appearing among mothers from rural areas all over the state (Rist, 1990).

The crack epidemic of 1985 resulted in another problem - an increase in the number of babies being abandoned by their mothers after birth. It was extremely unusual for a mother to leave an infant in the hospital nursery before the crack epidemic took place (Rist, 1990). In Bronx-Lebanon Hospital, for example, in 1983, 2% of babies born there were abandoned by their mothers and went directly from the hospital to foster homes - by 1990, 15% of all babies born at Bronx-Lebanon were

abandoned (New York Times, 1990b). This abandonment of infants happens because the cocaine-addicted mothers are not involved with taking care of their babies - they are involved with their need to obtain cocaine. These abandoned infants may also be a reason for the public impression that crack-exposed babies are mostly innercity black infants - many middle and upper class white cocaine using mothers probably have families who are in a position to take an interest in the infant. Many of the infants who are abandoned by their crack-using mothers must remain in the hospital for extended periods of time due to the lack of foster homes. These infants are being referred to as "boarder babies," and in a five city survey conducted by the Child Welfare League of America in 1989, they found 304 such boarder babies who had been medically cleared for discharge but not taken home. The majority of these infants had some signs of impairment apparently due to maternal drug use, especially cocaine (Rist, 1990). Many hospitals have attempted to help these infants by instituting programs to have outside people come to the nurseries to play with them (Revkin, 1989). Although this is helpful, the input of these volunteers cannot provide the nurturing and stimulation which a fulltime home could offer. In addition to the loss of enrichment for these infants, the obstetric and pediatric wards around the country are being overburdened and, as a result, the cost of health care is increasing (Revkin, 1989).

The number of cocaine-exposed infants being born each year cannot be accurately determined for many reasons, among them the inability to detect cocaine use more than 24 hours prior to hospital admission. Dr. Richard Fulroth, a Stanford University neonatologist, reported, "When crack cocaine hit Oakland, the number of small, sick babies just went through the roof" (Langone, 1988). In 1984, five percent of the newborns in Oakland's inner city area were intrauterinely exposed to cocaine, but by 1988 the figure had risen to 20% (Langone, 1988). In 1987, one New York City hospital reported that 10 percent of all newborns born there had a positive urine screen for cocaine (Smith, 1988). In 1988, a study of 36 U.S. hospitals found that "at least 11%" of the pregnant women surveyed had used illegal drugs during their pregnancies, most commonly cocaine (Langone, 1988). These numbers were assumed by the researchers to be low because full prenatal histories were not taken by the hospitals. The State of Florida "conservatively" estimated that its hospitals delivered 10,000 cocaine babies" in 1988. In 1989, cocaine abuse appeared in about 10 percent of births in hospitals in Dallas, San Francisco, and Gainesville, Florida. It was felt from studies that this 10% figure could be valid nationwide and that, because it was based on urinalysis on hospital admission, it only reflected the number of mothers who used cocaine 24 to 48 hours before delivery (Revkin, 1989). In Bronx-Lebanon Hospital in 1989,

urinalysis testing showed that 1000 mothers giving birth were drug users - nearly all used crack and most were black or Hispanic. In New York City itself, in 1989 21 out of every 1,000 childbearing women identified themselves as cocaine users - a 320 percent increase from 1985 (Rist, 1990). In 1989, the National Institute on Drug Abuse estimated that 14 percent of women age 15 to 44 had tried cocaine at least once; and in a Boston study, researchers found that 18 percent of 1,226 new mothers had used cocaine sometime during the pregnancy (Facklemann, 1989). In Rhode Island, a statewide anonymous survey in early 1990 revealed the presence of cocaine or its metabolites in 1 out of 40 laboring women admitted to hospitals in the state (Coustan and Carr, 1990). The estimated abuse figures varied, but all showed a serious problem. The Federal Government estimates currently that about 325,000 drug-exposed children are born each year, a third of which are crack-exposed (New York Times, 1990b). In some communities, doctors have seen what appears to be a leveling off of cocaine-exposed infants but feel that this is only because a "saturation point" has been reached among the people who are susceptible to crack use. Unfortunately, these crack-using mothers continue to get pregnant, some delivering crack-exposed infants for the third time (Revkin, 1989). A March of Dimes estimate is that the number of crack-exposed children could be from half a million to four million by the year 2000 (New York Times, 1990b).

CHAPTER FOUR
COCAINE-EXPOSED INFANTS

The "crack babies" have presented hospital workers and physicians with many challenges. These infants have been abused by their mothers even before birth, exposed not only to the direct effects of cocaine but also to the effects of the mother's life style and self-abuse. With other drugs, such as alcohol and heroin, workers have found that the pregnant woman's maternal instinct has been able to help her to stop her drug usage during pregnancy, but with crack, the maternal instinct appears to be overwhelmed by the need for the drug. These mothers on crack do not care about taking care of themselves, and they do not think of taking care of the developing fetus. As a result, there has been a tremendous increase in pregnancies which have had no prenatal health care (Revkin, 1989).

Cocaine-exposed babies are more likely to be born prematurely, and often this prematurity is substantial, resulting in babies which commonly weigh as little as two pounds. Although prematurity alone is life-threatening, these babies are in even more danger than other premature infants, as they are more likely to have hydrocephaly, poor brain growth, kidney problems, apnea, and to have suffered an infarct of the brain, which is similar to a stroke (Kantrowitz et al, 1990).

While strokes caused by intrauterine cocaine exposure are considered by some physicians to be relatively rare (New York Times, 1988), Dr. Chasnoff of Northwestern University has reported that they occur among many of these babies but are often blamed on the attending physician rather than being identified as cocaine related (Revkin, 1989). These strokes are caused by the fluctuations in blood pressure which cocaine induces, apparently causing oxygen deprivation to the fetal brain or causing its developing blood vessels to burst (Wallis, 1986). Some infants have been observed to suffer such strokes and survive, but they have done poorly (Breu, 1986). In animal studies, administration of small amounts of cocaine by different routes has resulted in the "popping" of blood vessels in the brain, which has been impossible for researchers to halt once the process begins (Behavior Today Newsletter, 1985).

Cocaine-exposed infants obviously have a bad physical start, which is compounded by their failure to eat well. To further the poor outlook for these infants, although the frequently reported retarded growth in the womb and accompanying smaller head circumference are easily noted, the neurological abnormalities are more subtle (New York Times, 1988) and may be missed if the observer is not trained (New York Times, 1990), particularly if the mother has abstained from cocaine use during the latter part of her pregnancy and delivered a child of more normal size (Chasnoff et al, 1989). In this case, the infant

may receive no special care or remediation whatsoever and simply be released to the care of an addicted parent, who lacks parenting skills and probably has impaired mental functioning (Giacoia, 1990).

According to the Westchester Task Force on Child Abuse and Neglect's report in 1989, eighty to eighty-five percent of all infants born to cocaine abusing women will exhibit signs of cocaine withdrawal within the first 72 hours after birth. These infants may continue to have some or all of these symptoms for up to 36 months of age. These are generally-accepted signs of newborn cocaine withdrawal:

a high-pitched cry
abnormal sleep patterns
hyperactive reflexes
tremors
rigid muscle tone
seizures
fever
poor eating with frequent regurgitation
constant fist sucking
vomiting, diarrhea, dehydration
apnea (failing to breathe)
tachypnea (breathing fast)
respiratory distress
nasal stuffiness (snorting)
mottling (having a mottled color)
sweating

The withdrawal symptoms are sometimes treated with decreasing doses of phenobarbitol, Valium, or tincture of opium, but even if medication is not necessary or when it is later discontinued, the babies still exhibit some symptoms of their abnormal neurological functioning (New York Times, 1986). The known

vulnerability of these infants to sudden infant death syndrome, is probably a result of apnea (Westchester Task Force, 1989).

Although some hospital workers downplay the lingering effects of prenatal cocaine exposure on these infants (Thornton, 1989), others who are involved with them believe that the minimum result of this exposure is going to range from "some kind" of learning disability to severe difficulties in learning, maybe in any motor movements at all (Schneider and Chasnoff, 1987; Wallis, 1986; Washington Post, 1986). Besides the obvious physical deformities sometimes observed as a result of the teratogenic effect of cocaine exposure, the infants of cocaine-abusing women often have the following defects (Schneider and Chasnoff, 1987; Wallis, 1986; Westchester Task Force, 1989):

strokes/seizures
cardiac arythmias, cardiac failure
abnormal EEGs
malformed hearts
extreme stiffness and rigidity
difficulty raising hips and legs
hypersensitivity
delays in language development
increased extensor tone
visual problems
lack of coordination
developmental retardation

Very little is known regarding the long-term outlook for cocaine-exposed infants because the groups being followed are only now becoming old enough for school. In addition, although physical effects of intrauterine cocaine exposure are easily seen and have predictable results, the subtle neurological abnormalities observed among the cocaine-exposed infants are new

phenomena and might conceivably gradually disappear or equally conceivably might be lifelong aberrations. This unpredictability is further confused by the impracticality of isolating the intrauterine effects of cocaine on the long-term neurological functioning of these children from the effects of growing up in the extremely disfunctional drug seeking environment (Chasnoff, 1988), which can contribute greatly to abnormal development (Giacoia, 1990). Dr. Yoon of Bronx-Lebanon Hospital, where many cocaine-exposed babies are born, applied to the Federal government for a grant to study these babies as they grew, but she was turned down (New York Times, 1990b).

Specifically, the problems observed in the development of cocaine-exposed newborns are as follow:

1. These babies are usually irritable, tremulous, and difficult to handle, soothe, comfort, or satisfy (Coustan and Carr, 1990; Rist, 1990).

2. The infants spend all their time either crying and cranky or in deep sleep - nothing in between (Revkin, 1989). They will go from being quiet to suddenly crying and screaming - and then they will suddenly be asleep again (Breu, 1986). Some babies appear to take refuge in this deep sleep and will remain in it 90% of the time, refusing to awaken even if physically manipulated (New York Times, 1988).

3. Normal stimuli are overwhelming to these babies. Even a face is too complicated a stimulus for them (New York Times,

1988). Due to their neurological problems, the babies are unable to focus on a human face or respond to a human voice (Chasnoff, 1988).

4. Typically, these infants avoid eye contact because it tends to overload them. If forced to make eye contact, they will shut their eyes. This is referred to as "gaze aversion" (Revkin, 1989).

5. These babies are hypersensitive, and merely picking them up can cause them to tremble and cry uncontrollably (Revkin, 1989).

6. These babies have very fragile nervous systems - a sudden noise or a change in position can overload them (New York Times, 1988).

7. The babies are distractible and cannot focus on objects, for example, on a rattle (New York Times, 1990).

8. The babies appear emotionally "cold" and do not interact with their caregivers (Coustan and Carr, 1990) or even respond to tickling and cuddling (New York Times, 1986).

9. These infants suffer difficulties with and delays in motor development which interfere with their exploration of their environments and bodies (New York Times, 1988).

10. The babies have tremors which interfere with the quality of their movements (Schneider and Chasnoff, 1987).

11. The babies have increased extensor tone which results in them being rigid (Schneider and Chasnoff, 1987).

12. The abnormal tone and movements of these infants often result in feeding problems (Schnider and Chasnoff, 1987).

Physicians who have followed these cocaine-exposed infants have found that their neurobehavioral abnormalities are exhibited for 8 to 10 weeks after birth and in some cases for as long as 4 months after delivery (Giacoia, 1990; Revkin, 1989). These physicians feel that these continuing neurobehavioral abnormalities create a further tragedy - preventing the bonding of the infant with the mother or other caregiver (Revkin, 1989) because the infant does not offer the caregiver any reciprocity. The infants are viewed by the parents as constantly demanding yet total unresponsive to any effort to interact with or comfort them (Schneider and Chasnoff, 1987). As a result of this lack of bonding with their caregivers and the resentment which the parent feels because of the infant's "rejection" (New York Times, 1988), many sociologists and pediatricians have expressed concern that the problems of these children will be compounded by their being at significant risk for child abuse (Revkin, 1989; Rist, 1990; Schneider and Chasnoff, 1987), particularly considering the lifestyle of the cocaine-abusing parent who has little interest in the infant and may have the volatile disposition frequently produced by crack (Coustan and Carr, 1990). These infants are frustrating for experienced professionals to handle, but they most often are sent home with mothers who range from unprepared to care for them to actively

crack-abusing and totally unresponsive to the baby's needs. In addition, because these infants are so difficult to care for, the parent frequently loses patience and either abuses the infant or turns it over to someone else. These unresponsive infants have trouble forming attachments, and being transferred to other caregivers makes this problem worse (Rist, 1990).

Because of the awareness of the bleakness of the home life to which a cocaine-exposed baby is often discharged, typically one of poverty and stark lack of nurturing (Rist, 1990), many hospital workers feel that the real challenge in handling these children is not in managing their withdrawal from cocaine but in trying to plan for further care for them (Chasnoff, 1988). Although they find it discouraging that so many of these infants are abandoned by their mothers and left in the hospital nursery, many hospital workers feel that these "boarder babies" are fortunate because they are at least assured of receiving good nourishment and medical care, in addition to getting some nurturing from the staff members and volunteers (Rist, 1990).

Dr. Ira Chasnoff, who has followed many of these cocaine-exposed infants since birth, feels that the impairments in the nervous system development which they suffer are likely to interfere with their ability to learn and to interact with their environment and people adequately, resulting in poor parent-child relationships and school failure. As he sees the problem, these are high-risk infants who need "optimal care-giving" in

order to recover, but dealing with the babies creates such frustration that the parents are not encouraged to be very optimal caregivers (Schneider and Chasnoff, 1987). Therefore, Dr. Chasnoff has been working with the parents and caregivers of the children in order to show them how to best handle the babies (New York Times, 1988). Although some foster parents have reported that hopeful prognoses are misleading and that even with careful nurturing, the exposed children have difficulty learning even simple things and are aggressive and hyperactive, it is Dr. Chasnoff's belief that the abnormal neurobehavior might diminish over time, particularly with proper parental care (New York Times, 1988). In 1988, there was no established treatment for cocaine babies and parenting programs were started at Northwestern University Hospital to teach the mothers how to deal with the difficult babies. One problem seen with developing parenting programs is that such programs assume maternal motivation exists, but this is usually not the case with cocaine-abusing women (Langone, 1988). Dr. Chasnoff and his co-workers discovered that in order to help the babies, the mothers must not only stop using drugs during their pregnancies but must also be given intensive training in nurturing and parenting (Rist, 1990). They felt that this parent education would assist in encouraging normal infant development and that this was very important because the babies were a very high risk group for later problems (Breu, 1986). The researchers also

found it was very effective to present the parents with the positive aspects and strengths of the baby to prevent their preoccupation with problems and weaknesses (Schneider and Chasnoff, 1987).

Dr. Chasnoff stated that although cocaine-exposed babies at one month of age are not functioning at the level of unexposed 2-day-old infants, it would appear that these cocaine-exposed infants could eventually catch up developmentally if placed in good environments (Revkin, 1989). The methods of overcoming the babies' problems which have been developed by Dr. Chasnoff and his associates at Northwestern University, notably Dr. Dan R. Griffith, a developmental psychologist, and Jane Schneider, a physical therapist, have been apparently successful with at least one cocaine-exposed infant who was adopted by a motivated couple. During his first 7 months, with careful nurturing, the baby became less hypersensitive and more responsive, smiling and giggling when played with. He also grew in a satisfactory manner and showed every evidence of being on a steady upward path (Breu, 1986).

In order to help the development of these cocaine-exposed newborns, the following handling techniques are useful for the babies' caregivers:

1. Pacifiers are calming to these babies.

2. The babies react well to being swaddled in a towel, apparently needing to feel the security of boundaries (Breu, 1986).

3. These infants should be held in a semiflexed position, which breaks up the extensor tone and decreases tremors (Schneider and Chasnoff, 1987).

4. The signals of distress which show that the babies are becoming overly stimulated must be recognized. These signals include hiccoughs, yawns, sneezes, grimaces, jerky movements, flushed skin, averted or closed eyes and crying. If these signs are ignored by the caregiver and stimulation continues, the baby will often lose control (New York Times, 1988).

5. When a baby is overly stimulated, it must be calmed. The babies should not be left to cry - the caregiver should do whatever can be done to calm the baby down. Removing all stimuli and swaddling the baby in a blanket have been found to be effective (Schneider and Chasnoff, 1987).

6. Because the researchers have learned that these babies cannot handle more than one simple stimulus at a time, the caregivers are taught to not present the babies with more stimuli than they can handle. For example, if the mother talks to the baby, she should do this without moving. If she moves, she should not talk to the baby at the same time.

7. Because these babies have shown that a face is often too complex a stimulus for them to handle, the babies should be held close but facing away from the mother so that the baby can remain calm. The researchers have found, in fact, that it is

easier for these babies to follow a moving ball than it is for them to look at a face (New York Times, 1988).

8. Slow rocking in conjunction with swaddling has been found to immediately arrest crying, reducing the infant's irritability and bringing it to a visually alert state. This is also effective in developing better parent-child relationships by creating a feeling of interaction and making the parent feel more effective (Schneider and Chasnoff, 1987).

9. A great deal of help is needed in order for these infants to maintain control of their sensitive nervous systems. Holding the baby vertically with support under the thighs, rocking gently up and down, will usually help the baby calm down and get control of itself (New York Times, 1988).

10. The babies need to be stimulated without being over-stimulated (New York Times, 1988). With an infant who is calm, looking directly at the baby and talking will help to stimulate its development (Breu, 1986; Schneider and Chasnoff, 1987).

11. Caution must be used in holding the babies, as they often become upset when held too close. If the caregiver keeps being intrusive when the baby is trying to ignore the stimulus, the baby will be pushed too far and the caregiver will at the same time feel resentment because of the baby's rejection (New York Times, 1988). This will result in negativity between them.

12. Hydrotherapy has been found effective in improving motor control and reducing irritability.

13. Positioning in sidelying, with the baby's spine and head flexed, helps prevent hyperextended posture. Developing a more flexible posture will also reduce feeding problems.

14. These hypersensitive babies may also display oral hypersenstivity which will exacerbate feeding problems. By gently "playing" with the baby's face and mouth, this sensitivity can be decreased.

15. The swaddling, rocking, and other calming methods must not be overused and must be gradually withdrawn in order that the babies can learn to control and calm themselves (Schneider and Chasnoff, 1987).

It has been found that cocaine-exposed infants are forty times more likely than unexposed infants to suffer delays in motor development. These motor difficulties can interfere with the babies' crawling and walking and prevent the developmental enrichment which comes from normal exploration of their bodies and nearby objects (New York Times, 1988). The increased muscle tone of these infants, particularly extensor tone, acts together with their delayed reflexes to inhibit them from reaching for and manipulating objects. Their postures tend to be overly extended, with limited pelvic mobility and use of their legs. Their legs are held stiffly when they are supported to stand, and they often arch in extension (Schneider and Chasnoff, 1987). Studies by Jane Schneider have shown the developmental problems of these infants may go through various stages - by four months

of age problems with movement are observed. The babies tend to be stiff, sometimes almost rigid, with difficulty in rounding their hips, raising their legs, or bringing their hands together. Their fists will not be relaxed, and when they stand, they are apparently unable to relax enough to sit back down (New York Times, 1988). These physical problems add to the infant remaining irritable and physically difficult to handle (Schneider and Chasnoff, 1987).

These motor abnormalities can be somewhat alleviated by proper holding and moving of the infants by their caregivers, and they are also being taught these techniques by the staff at Northwestern (New York Times, 1988). Some of these treatment concepts consist of:

1. When playing with these babies, quick rough movements must be avoided. Play with these infants should consist of slow, gentle movement through space, with the parent watching the baby's reaction to see what the limits are.

2. The babies should be held in a relaxed posture by the parent upright against the parent's hip with a hand under the infant's thighs to keep the legs flexed and the shoulders rounded in such a way as to permit the hands to come together.

3. Until the babies can lift themselves up to a standing position, they should be discouraged from standing. Although the babies enjoy standing because their abnormal extensor tone is more comfortable in this position, this position reinforces the abnormal tone.

4. Infant walkers and jumpers should not be used in view of the babies' stiffness, because the walkers keep infants from getting the benefit of crawling around and because they encourage higher extensor tone development with pushing of the infants' feet against the floor.

5. Putting the baby in prone position (face downward) helps the baby develop antigravity extensor strength, and they usually enjoy this position. Additionally, movement can be encouraged by putting objects nearby which they can reach for.

6. In supine (on back) position, the parents are taught to lift the baby's pelvis up, flexing the legs toward the chest. Extensor tone can also be decreased by rotating the infant's lower body from side to side, possibly also bringing the upper body down and forward to allow more use of the infant's arms.

7. Leaving the babies lying on their backs for long periods should be avoided, as the position accentuates their stiffness and the babies find it difficult to move by themselves in this position.

8. Sitting with support is encouraged for short periods to increase antigravity strength. Bending the infant forward at the hips when the infant tends to push backwards will help combat further development of abnormal extensor tone (Schneider and Chasnoff, 1987).

In spite of all the work which Dr. Chasnoff, Dr. Griffith, Ms. Schneider, and others throughout the country have done with

these cocaine-exposed infants, it is still not clear what the ultimate outcome of these neurobehavioral and motor problems will be. Some researchers have found that the majority of these infants actually appear to move increasingly more poorly than normal infants as they get older. While it is hoped that these aberrations will eventually disappear either through remediation or through self-repair or retraining of the infant's central nervous system, it is also possible that the abnormalities may progress into even more disabling movement disorders (Schneider and Chasnoff, 1987). Further, with all the neurological and motor development problems which these cocaine-exposed infants have at birth, there is increasing evidence that their problems with cocaine-exposure will not necessarily end at birth. Studies with rats by neuroscientist Richard Wiggins of West Virginia University Medical School showed that the concentration of cocaine was 8 times higher in their milk than in their blood (Revkin, 1989). If a breast-feeding mother is still using cocaine, the baby therefore will be at even more risk than it was in the womb for damage to its developing neurological system and brain - and its ability to metabolize cocaine is still immature and inefficient. In a pediatric hospital study of cocaine use in children, intended to examine the scope of self-administered cocaine use in youngsters, the researchers were surprised to discover cocaine exposure in three infants aged 7 months, 2 months, and 6 weeks. One of these infants

could have been exposed through the breast milk of its mother, but the other two infants apparently had cocaine actively administered to them. This intentional administration of drugs is reportedly not uncommon and is an identified method of child abuse (Shannon et al, 1989). In addition, in crack-using homes, physicians are beginning to suspect that serious injury may be occurring because of the crack-filled smoke which the children must breathe (Kantrowitz, 1990). These possibilities of continued cocaine exposure to these children, together with their urgent need for proper nurturing and stimulation, leads to a moral problem for society - Should these infants be sent home with their drug-using mothers? (Smith, 1988). Although even the crack-abusing mothers who do not abandon their infants are believed to be unfit parents who will not provide adequate nurturing for the children, these babies are too numerous to remove from all such parents. As Dr. Loretta Finnegan of Jefferson Medical College in Philadelphia, stated, "We simply can't take all these babies away from their mothers. Where are we going to put them?" (Kantrowitz et al, 1990).

CHAPTER FIVE
COCAINE-EXPOSED CHILDREN

The majority of work with cocaine-exposed infants and children has only been going on for a maximum of five years, and it appears so far that the neurobehavioral abnormalities which have been observed at birth are remaining a problem. The group working with these children at Northwestern University has discovered that the tendencies to withdraw from intimacy and to avoid stimulation do not disappear. The difficulty with forming attachments and the lack of emotional response have not gone away, and this is felt to contribute to a poor prognosis on classroom adaptation and learning in later years (Rist, 1990). The preliminary findings of Dr. Griffith, a Northwestern University psychologist working with these children, indicates that the next stage of the neurological abnormalities exhibited by these children will be classroom problems - learning disabilities, hyperactivity, and difficulty focusing (New York Times, 1988).

Cocaine-exposed children are being worked with in a special program for infants sponsored by Houston's Mental Health and Mental Retardation Authority. They have also found the problems with these children to be long term and note that these children are operating only on an instinctual level - an eating and sleeping existence sometimes accompanied by tremors. These

children do not interact with nor relate well to peers and are at times withdrawn and off in their own world (Kantrowitz et al, 1990). While most research indicates that the majority of crack-exposed children have the capacity to develop intelligence in at least the low-normal range, it is feared that their sub-normal emotional development may keep them from being able to relate adequately to other people or to acquire basic employment skills without receiving a great deal of help (New York Times, 1989). Early identification of fetal cocaine exposure and consequent early treatment of the child is felt to provide the best hope for these children, but most of them are not being provided this special attention (Rist, 1990).

Early intervention is necessary with these children because of their inherent characteristics of extreme withdrawal and aggressive behavior. These traits appear right after birth, and are ideal ones with which to cope with the chaotic home environments in which the children commonly find themselves. The fact that aggression and withdrawal are natural and appropriate responses to the surroundings of these children causes the behavior to be rewarding and resistant to change, so it is necessary to work with them before this point if they are to reach their maximum potential (Rist, 1990).

Dr. Chasnoff and others at Northwestern University have followed 263 babies for two years and have routinely performed various intellectual and developmental tests on the group.

Although the children's performance on structured tests appears to be in the low end of the normal range, there are problems with the actual performance quality, because the children appear unable to concentrate and organize their responses when presented with more than one object or task at a time. Difficulties have also been seen with tests measuring group interactions and performance in unstructured environments (New York Times, 1989). In working with these children, Dr. Griffith of Northwestern has found they cannot tolerate frustration, have difficulty structuring information, and are easily overwhelmed by the input of information (Rist, 1990).

In California, Dr. Judith Howard began seeing cocaine-exposed babies 11 years ago and has consistently found them to be lethargic. She feels that this lethargy is caused by the combinations of drugs which cocaine-abusing women often take, particularly sedatives to ease the crash after cocaine highs. Although Dr. Howard observed many problems with these babies at birth, including their apparent blindness and their rigidity after four or five weeks, she found that improvement was steady, with normal vision by 9 months and more calmness and better motor skills as the infants approached one year of age. When left alone, however, the toddlers still appeared unmotivated and uninterested in their surroundings. To determine whether the cocaine-exposed children really were not reacting normally to play situations, Dr. Howard compared two groups of eighteen-

month-old toddlers from similar backgrounds, one group exposed to cocaine intrauterinely and another group born prematurely but not drug-exposed. At first, although the cocaine-exposed infants scored consistently lower in testing sessions, both groups of toddlers appeared the same in development. It was apparent that there was a difference between the groups, however, when the toddlers were left to play by themselves. The best score of times toys were put into novel conformations among the premature babies was 38 combinations, while the best score among the cocaine-exposed babies was 10. The premature babies played normally, combing dolls' hair, making motor sounds with toy trucks, etc., but the cocaine-exposed babies scattered the toys, hitting, throwing, and batting at them, picking them up and putting them down without purpose, displaying no enthusiasm in their faces or in their body language (New York Times, 1989).

This emotional flatness has been frequently observed by those who work with these children, even with those children who have received good medical care and educational therapy all their lives (New York Times, 1989; Rist, 1990). In a pilot program for drug-exposed children in Los Angeles, researchers are observing that the original problems which the cocaine-exposed infants displayed (inability to deal with multiple stimuli, acting aggressively or withdrawing completely in response, and not being able to form attachments to anyone) are still present in preschoolers (Rist, 1990). These children on

the whole appear less attached to their caretakers than normal and do not express any distress, anger, or pleasure at being left with strangers. The withdrawal and lack of emotion in these children is similar to the symptoms of mild autism and other personality disorders, and there is apparently an impairment which makes them disorganized and prevents them from normal enjoyment (New York Times, 1989). Although doctors have not yet discovered the precise etiology of these problems, neurological damage would appear to be the cause (Kantrowitz et al, 1989). Researchers feel that fundamental neurological pathways in the brain have been altered by cocaine and that the pleasure and reward pathway would be especially vulnerable to this alteration (New York Times, 1989). Regular users of cocaine become anhedonic, a condition in which normal pleasure is not felt (Lamar, 1986), and in an adult, the changes in the brain caused by high-dose cocaine abuse can last for as long as six months (Narcotic and Drug Research, c.1988). It is possible that an infant developing while cocaine is being ingested may have been prevented from forming the physical wherewithal to "change back" to normal brain pathways. This would go along with Dr. Howard's statement that it is as if the part of the child's brain that "makes us human beings, capable of discussion or reflection, has been wiped out" (Kantrowitz et al, 1989). Interestingly, scientists have recently announced the discovery of a specific metabolic abnormality in the brains of people with hyperactivity

which is probably the cause of the condition. The parts of the brain which are essential for attention and controlling behavior are less active than normal, and brain activity is significantly reduced in 30 out of 60 specific brain regions (Times Herald Record, 1990a). This syndrome could conceivably result from cocaine-induced neurological damage and explain the hyperactivity often exhibited by these children.

Because of the slow maturation of children, in order to get an idea of the ultimate functioning of cocaine-exposed offspring, studies have also been done with intrauterine cocaine exposure in animals. One such study with the nervous system development of rats at the State University of New York at Binghamton, in which the offspring were exposed through the last half of pregnancy, shows permanent damage to learning ability and cognitive functions. While the exposed offspring had apparently unimpaired motor development and were able to develop normal reflexes, their ability to learn and make normal cognitive connections was impaired (Revkin, 1989).

Dr. Griffith has noted in testing these children at age two years with standard development tests, that they can perform within the normal range so long as they are tested one-on-one with only one task at a time. When asked to carry out more than one specific task or handle more than one toy or tool, they decompensate, withdrawing or becoming hyperactive (Rist, 1990). Dr. Howard has found that these children do not initiate social

interaction, need a great deal of direction, have short-term memory loss problems and short attention spans, and do not handle new situations well (Revkin, 1989). It is becoming apparent to many researchers that with their emotional, neurological, and learning problems, these cocaine-exposed children are not going to easily fit into a regular school class (New York Times, 1990a). Many physicians and others who work with these children have expressed concerns about the unpreparedness of public school systems to deal with these children's needs (Kantrowitz et al, 1990; New York Times, 1990a; Revkin, 1989).

Another physician who has done a great deal of work with these cocaine-exposed children, Dr. Bean of Martin Luther King Hospital in Los Angeles, feels that the disaster of these children is that public schools are already limited in dealing with the needs of poor and minority children and have very little chance of dealing with this group's increased special needs. With this in mind, she believes that "These children enter school with an absolute prescription for failure" (New York Times, 1990a). Based on the evidence from some of the early intensive work done so far with these children, however, she and other workers believe that there is a favorable prognosis for more normal lives if intervention is early enough. All who have worked with these exposed children seem to agree that they will need a great deal of structure and individualized

attention early in life in order to have a possibility of success (New York Times, 1989, 1990a).

This early intervention is possibly working at a special daycare center in Florida, where they are handling children between the ages of 2 months and 5 years. The program provides the children with structure and affection. When the children started in the program a year before, their attention spans were from 3 to 5 seconds. Although the attention spans are still several minutes less than those of unexposed children, they are now up to 5 minutes long. While workers are hopeful, they feel that they have not had enough experience with the children to be sure that the improvements will last and note that when the structure is removed, the children tend to withdraw again and fail to interact with other children (New York Times, 1989).

In the Salvin Special Education Center in Los Angeles, teachers have been working for three years with exposed children who test in the normal intelligence range and have developed the following special techniques which they have found to be effective (New York Times, 1990a):

1. Sudden changes in activity upset these children. Therefore, the teachers give ample warning of activity changes both verbally and with music so that the children can adjust to the changes and not over-react.

2. These children have difficulty interpreting nonverbal signals. Therefore, the teachers are careful to exaggerate their gestures.

3. These children have difficulty forming relationships. Therefore, they have the children remain with the same teacher for more than a year so that trust can be developed.

4. These children have difficulty focusing on one activity or one toy - they are disorganized. Therefore the teachers help them by guiding their activities and encouraging them to talk out their frustrations.

5. Speech and physical therapists work with the children to develop their language and motor skills.

In accordance with these principles, music is played during activities at the Salvin Special Education Center. When it is time for another activity, the music is changed and the children are told to sit quietly in a circle for a few minutes. If the children are distressed, they are not left to cry but are held and comforted. If the children behave aggressively with each other, the teachers react with exaggerated and alarmed body language and then address each child individually, encouraging him to talk about his feelings and letting him know that direct attention is being paid to him (New York Times, 1990a).

Teachers at another center, the Miriam de Soyza Learning Center in the Bronx, have developed similar techniques to work with crack-exposed children. Although the program was designed for children with a variety of emotional and physical handicaps and not specifically implemented for the crack children, the teachers there are working with them. They have found that

these children lack basic socialization skills and require hours of individual attention in order to reap modest rewards of nodding, smiling, speaking a little, hugging, and participating in activities. The children can be aggressive and violent, and classroom rules must be introduced slowly, with the children frequently needing to be removed from the classroom and held and rocked by the teacher because of their acting out. Improvements were often not seen for many months, and the teachers found that it was very difficult to be able to pay any attention to the other children while working with a cocaine-exposed child. In addition, in one case described by the teachers, social improvement was only made with people familiar to the child - he continued to react negatively to strangers. Other instructors in this preschool program expressed their concern about what will happen to these cocaine-exposed children, noting that the intense and exclusive attention they need simply cannot be provided within the atmosphere nor with the staff of the public school system (New York Times, 1990a).

The reason these children are not expected to fit into a regular classroom is not that they are totally unable to learn. The problem is that the normal classroom environment does not provide the additional structure, lower adult/child ratio, increased emotional support, and extra effort from the teacher to establish a satisfying attachment with the child that is necessary for them to function. When these things are provided,

experts believe that, based on their findings, these children will gradually be able to adjust to the regular school classroom. They caution, however, that their experiences have been only with children who received early treatment and remediation, which is not the case with the majority of these cocaine-exposed children (Rist, 1990).

CHAPTER SIX
RECOMMENDATIONS FOR TEACHERS

While physicians and other hospital workers began noting that infants were being affected by intrauterine cocaine exposure at least as early as 1983, the epidemic following the introduction of crack cocaine resulted in the majority of exposed children beginning to be seen in 1986. This flood of cocaine-exposed children will soon appear in classrooms. Estimates of as many as 200,000 of such exposed children being born yearly have been made, although more conservative estimate figures are between 30,000 and 50,000. Estimated births in New York City are 7,000 yearly; in Washington, D.C., the figure is estimated to be 1,500 (Rist, 1990). No matter which estimate is believed to be accurate, there is little question but that teachers are already seeing "crack children" in their classrooms and are going to be seeing many more (New York Times, 1990a). These children will not necessarily look different than other children in the classroom, because the results of cocaine exposure are often not physically obvious. Not enough time has yet gone by to determine whether the abnormal neurological patterns in these children's brains which have resulted from their intrauterine crack exposure will be lifelong and what the specific behavioral and learning problems that result will be (Rist, 1990), but many of these children will be easy to

recognize. They will appear developmentally delayed, detached, unable to interact and possibly overactive with no self control. Basically, these children will lack the skills that children of their age should possess and will appear to not know how to behave, both because of their neurological problems and because of the chaotic and neglectful environment in which most cocaine-exposed children live (Palm Beach Post, 1986).

Cocaine-exposure causes children to be born prematurely because of abruptio placentae, sometimes weighing as little as 500 grams (Revkin, 1989). Prematurity and low birth weight have a high correlation with lowered intellectual functioning, and such children therefore are very likely to be mentally retarded (Patton et al, 1990). In addition, many of these children are born with smaller-than-normal heads, which usually results in some recognizable degree of developmental disability by ages 3 to 6 (Langone, 1988; Revkin, 1989). Many of these children are subject to seizures in early infancy. When seizures occur in infancy, they often indicate cerebral palsy or mental retardation (Silverman, 1989). Research has shown that 15 to 30% of children who have seizure occurrences have learning disabilities. In addition, those whose seizures have a known cause, such as intrauterine cocaine exposure, have been shown to have lowered I.Q. scores, as have those whose seizures occur before the age of 5 years (Matthews and Barabas, 1985). These factors by themselves make it likely that many cocaine-exposed

children will be mentally retarded or learning disabled. When the children have these obvious classifiable handicaps, they will be placed in special education programs, where they will probably receive some individual attention and remedial work (New York Times, 1990a). While this is better than the feared situation in which the unclassified cocaine-exposed children will land in public school classrooms with no preparations made, it is this author's opinion that it is also not optimal for them because they will be handled in view of their obvious problems, which will not be their only ones. These children will need as much opportunity as possible to develop in normal social situations (New York Times, 1990a). When considering the fact that they have impairment in their ability to play, which is part of normal development (Kantrowitz et al, 1990), it is clear that without intervention they will miss out on a great deal of social learning.

Many of these children are exhibiting symptoms of attention deficit and hyperactivity disorder (ADHD), which is characterized by short attention spans, poor self control of behavior, and aimless restlessness. This is a common disorder and has been the subject of a good deal of study, which has shown that 40% of affected children display negative behavior consisting of instigating fights, stealing, disobedience, defiance, lawlessness, and lying. In up to 50 percent of those affected, the disorder does not disappear

in adulthood, and as adults, these individuals exhibit anti-social behavior and criminality (Weiss, 1990).

Most school systems have, to date, made no special efforts or developed any special programs to deal with the expected coming flood of cocaine-exposed children. It is predicted that within a few years, such children will make up 40 to 60 percent of the classes in some innercities (New York Times, 1990a). While it is agreed that experts are going to be needed to deal with these children, few experts have been produced (Kantrowitz et al, 1990), even among special educators. It appears certain that at least some of these children will require special education, but it is not clear what classification they will fit into - mentally retarded, emotionally handicapped, multiply handicapped, or neurologically impaired, or whether a new classification will result from their entrance into the school system. Those who have worked with the children indicate that they are afflicted with seizures, cerebral palsy, and mental retardation only in the most severe cases and that many of the exposed children score in the normal range on standardized testing. These children will subsequently be placed in regular classrooms, which is a problem because the majority of the exposed children have been found to display other symptoms which aren't reflected on the testing, such as hyperactivity, emotional lability and emotional flatness, extreme passivity, delayed language development and speech impairments, low

frustration levels, difficulty interpreting nonverbal signals, inability to deal with multiple stimuli, short attention span and difficulty concentrating, and poor short-term memory. As a result, the regular classroom teacher, relying on the test scores and unaware of the special education needs of these children, will perceive them as troublemakers (New York Times, 1990a) These teachers will then be likely to reinforce the negative responses with which these children have learned to handle rejection.

Even teachers who are prepared for these children and recognize their emotional and learning problems will find it difficult to meet their needs (New York Times, 1990a). This author has been interested to note that, although these cocaine-exposed children are not clearly mentally retarded, they have several behavioral characteristics commonly associated with children suffering from fetal alcohol syndrome (FAS), such as hyperactivity, short attention span, and poor organizational and focusing skills (Streissguth and Giunta, 1988). Some of the techniques developed for the education of FAS children are therefore probably equally suitable for these cocaine-exposed children. The following should be of interest to teachers who may find these cocaine-exposed children in their classrooms:

1. In working with these children in preschool situations, educators have found that they need a great deal of stability and security. Therefore, they have them remain with the same

teacher for two years, and it is recommended that this be continued in the school situation, allowing the children to remain with one teacher for more than the usual one year.

2. It is recommended that the school schedule for these children be modified to eliminate sudden switching from one subject to the next and disruptions in routines (Rist, 1990).

3. These children will require a great deal of structure in the school environment. They will need to know what to expect during the day and have an established routine. Although gradually they may improve in their ability to regulate themselves, prior work has shown that when structure is removed, the children tend to again become withdrawn (New York Times, 1989).

4. Clear expectations are important, and appropriate responses must be reinforced (Streissguth and Giunta, 1988).

5. These children will be withdrawn or overly aggressive in many cases; but referring them to a psychologist will probably not be helpful, and the parents will often not deal with the problem (Rist, 1990). The teachers of these children will, as a result, find the situation very frustrating and will have to develop methods of coping with the children.

6. These children are likely to be unable to pay attention to information the teacher is presenting to the whole class. While other children in the classroom are addressed as a group, the exposed child may need to be given one-on-one instruction.

7. The typical classroom, with the many things which go on during the day or even at the same time, will cause these children to decompensate - they will either withdraw totally or act out. The stimulation will be too much for them to handle (Rist, 1990).

8. Teaching these children will be disappointing. After a successful learning experience one day, they may have forgotten everything by the next day (New York Times, 1990a).

9. Special consideration needs to be given to the psychological and emotional needs of these cocaine-exposed children, and this consideration will need to pass the boundaries which have been deemed acceptable or fair in the past. These children have difficulty in forming attachments to other people and will need to be given special treatment, in fact what might appear to be favoritism, in order to provide remedial nurturing (Rist, 1990). This will require careful handling in the typical school situation.

10. These children are going to need understanding. It will be hard for a teacher to keep in mind that the child is a victim of neurological damage when the overly stimulated child is acting out or is withdrawn, and the teacher's attitude and development of a relationship with the child will be important in the child's adjustment to school and life itself.

11. These teachers are going to need understanding. The teacher might find him or herself becoming resentful of the

increased pressures and burdens of dealing with these children (Matthews and Barabas, 1985).

12. These children are often going to have very poor home environments. Because of crack's intensely addictive nature, the parents are likely to be actively using crack and consequently taking very little interest in the child. Children in crack-addicted homes may not be bathed, fed, put to bed, played with, or of much concern to their parents. These "crack children" are in an even worse situation than the children of past drug epidemics. While heroin addicts often had no interest in their children and neglected them, crack addicts often are aggressive, angry, and cruel (Westchester Task Force, 1989). These children's homes are not havens - they are at best places where the child is ignored and at worst places where the child is abused. The effects of the parent's cocaine use on the fetus are compounded by the effects of the parent's emotional abuse of the child. And, of course, this will contribute further to these children's abnormal development, as good homes, along with good school situations, are crucial if these children are to have a chance at succeeding (New York Times, 1989).

13. The sooner these children have their problems recognized and help given, the more chance there is that the problems can be overcome. The classroom teacher, unfortunately, may be the first person who becomes aware that a child is displaying the symptoms of intrauterine cocaine exposure. The teacher in

this situation will not be in a position to question the parent about prior drug use and confirm the exposure in that way but will probably have to simply proceed in using the techniques found effective with cocaine-exposed children so as to give the child the benefit of what is, at this point in time, the earliest help possible. Teachers must also be on the alert not to expect to only find cocaine-exposed children among minority students or children from lower socioeconomic families. Because white middle-class women have found it easier to hide their cocaine use, their cocaine-exposed infants are expected to be frequently undiagnosed at birth. While the parents will probably be aware that they have had trouble with the child, significant early remedial efforts will probably not have been made.

14. It is important not to prejudge these children. It is feared that due to society's image of these cocaine-exposed children as poor, minority children of parents with low moral character, they will be discriminated against in the public's mind and the teacher's heart. These children are already sometimes referred to as a "bio-underclass," and this perception could create a self-fulfilling prophecy in which the children turn out as the teachers and society expect them to (New York Times, 1990a).

15. With children suffering from intrauterine cocaine-exposure, as with other syndromes which require special

education, a teacher must know what strengths and weaknesses can be expected in the student in order to develop appropriate educational goals. In addition, it is necessary for teachers to know the long-term level of functioning which can be expected from a student in order to present material that will be meaningful and relevant for the student's expected life and support arrangements. Even in special education classes, there is a tendency to treat mildly handicapped students homogeneously (Smith, 1989), but the needs and future development of these cocaine-exposed children are likely to be quite different from other children who have similar mildly handicapped labels. These cocaine-exposed children have been studied since birth, and studies are continuing in an effort to ascertain what their long-term neurological functioning will be. A teacher will often feel insecure and uncomfortable when lacking information on how best to help a child (Matthews and Barabas, 1985), so it is in both the affected children's and the teachers' best interests that teachers not only educate themselves about the needs of these children but also keep up with the findings from studies of their long-term development.

CHAPTER SEVEN
CONCLUSION

It is overwhelmingly clear from this review that large numbers of children have suffered intrauterine exposure to cocaine and that this exposure causes damage to them, particularly to their neurological systems. While no program, either with infants or preschoolers, has proven to date to be totally effective in remediating the effects of intrauterine cocaine exposure, progress is being made in helping these children learn to cope with their inability to deal with the everyday world in a normal manner. Many cities are attempting to get ready to help these children - Pittsburgh is forming alliances between health and social services to study the needs of the children (New York Times, 1990a), and Los Angeles has begun preparing teachers and has instituted a pilot education project to work with the children, at a cost of $15,000 a year per pupil (Dorris, 1990). Some school districts in Florida and Georgia are planning teacher-training workshops to help teachers recognize and assist the crack-exposed children. Most cities, however, have developed no policies and are considered by experts to be unprepared. New York, expected to have the largest population of these drug-exposed children, has been reported to have developed no specific plans for them (New York Times, 1990a).

Some educators are arguing that these children may be stigmatized if special preparations are made for them and that the problems which have been described are only those shown by emotionally disturbed, abused or neglected children (New York Times, 1990a). Many people who have worked with these cocaine-exposed children believe that they must not be labeled and must mingle with normal children if they are to ultimately adjust to society. They believe that regular classroom teachers can be trained to help the children overcome their neurological problems and that this training will also be useful to teachers in working with other impaired children. In opposition to this, interviews with educators in the literature reviewed have noted that a teacher dealing with many children cannot devote adequate attention to the needs of an exposed child and that if the teacher tries to devote the required attention to the exposed child's needs, he or she cannot provide for the needs of the other children in the class.

It has been noted that not only are these exposed children neurologically impaired but in many cases the lack of home stability is so severe that the children have been passed through several different homes early in life, for example, from mother to grandmother to foster care. This combination of problems makes it even more unlikely that the children will fit into a regular classroom (Rist, 1990). In the studies of alcohol-abusing women performed in connection with fetal alcohol

syndrome, where the researchers could find the mothers, they found that 38% were dead by the time the children were age 6 and 69% were dead by the time the children were in their late teens (Streissguth and Giunta, 1988). This pattern is very likely to be observed with the cocaine-abusing mothers of the exposed children, who live dangerously and are even less likely than alcoholics to eat and take care of themselves properly. This offers the probability that those cocaine-exposed children kept by their mothers will end up without even the little stability they had at some point in their early lives. At this point, they will also have embraced the withdrawn and aggressive behavior which came naturally to them and was reinforced by their environments, and they will be old enough to be resistant to remediation, leaving them without a natural family and unattractive to foster care.

It is apparent that prenatal cocaine exposure is going to have to be dealt with and stopped. Three things need to be done. Cocaine use, particularly by pregnant women, must be halted. Society must develop a way to put these cocaine-exposed children in environments in which they can heal. Educational plans must be developed to offer these children a possibility of a human future.

Efforts to halt and discourage cocaine use have been made; but they will not be detailed here. The United States government appointed a "drug czar" to oversee these efforts. Crack

use, however, seems to be largely tied in to social problems and lifestyles which are resistant to change. One reporter went out and bought crack and smoked it in order to write about its effect (Morley, 1989). After his experience, he believed that the reason smoking crack is so popular among the disadvantaged is that it induces feelings of well-being and "upper-middle-classness," which the users have no hope of achieving otherwise. Ironically, this drug, inducing these feelings of security and success, can cause the children of the users to have no hope of ever achieving security and success. Currently, efforts to halt cocaine abuse have often addressed prosecution of mothers who are subjecting their babies to cocaine in the uterus. A woman was convicted of charges involving intrauterine cocaine exposure in August 1989 and sentenced to a year in a drug treatment center and 14 years of probation (Kantrowitz et al, 1989), but in Illinois, a grand jury refused to issue an indictment of involuntary manslaughter to a woman who had killed her fetus through cocaine use (Rist, 1990). Although to date there are only about 20 cases of this nature around the United States, they have caused a great deal of controversy. Prosecutors have used a variety of laws to get the mothers to trial, as most child-abuse statutes don't apply. In most states, a fetus is not given the rights of a child and cannot therefore legally be abused. Some people are in favor of prosecuting mothers who expose their babies to harmful substances in the uterus and say

that it will force them to assume the responsibility to stop and get treatment. Others argue that prosecuting the mothers will only expose the babies to more suffering, as the mothers will be even less likely to get prenatal care or even to deliver the baby in a medical facility if they know they can be prosecuted for drug exposure detected in the infant (Kantrowitz et al, 1989). Many people see this as a civil rights issue and do not seem to be aware that more is involved in this situation than the right of the mother to use drugs (Sixty Minutes, 1990). The scope of the problem and the damage being done to the children and to the society which must both support them and live with them, are not being publicized enough.

One positive note has recently been sounded in the crack situation - studies have shown that most crack users began their crack use prior to 1987 and that new users are relatively rare. This is believed to be due to disenchantment among those who have observed the damage done by crack in their families and their resultant reluctance to use it themselves (Times Herald Record, 1990). It is possible that what society hasn't been able to halt will gradually be halted by those who have been victimized by the epidemic.

Boarder babies are still in the hospitals, however, and fragile, cocaine-exposed infants and children are still living in violent and unsupportive crack-using homes. While social workers and hospital staff members have been reluctant to send

these babies home with crack-using parents and have expressed distress at being unable to avoid sending a child back to an environment where abuse is a strong possibility, they have not felt that an alternative existed. The foster care system has not been able to find homes for those children whose parents refused to take them, much less to insist on custody of those whose parents did not abandon them. William F. Buckley proposed taking children and their single mothers in New York to upstate camps until the age of 10 "where recreation and study can proceed other than in drug-ridden streets." (Times Herald Record, 1990b). While this is unlikely to be accomplished, several other proposals have been made to deal with these children, among them creating orphanages where they will at least be well fed and have structured, supportive environments. Another proposal is to remove those children deemed to be in homes where no stable family care is possible and to permit them to be adopted (Rist, 1990). While this proposal, on the face of it, sounds better than orphanages, in reality this author doubts the existence of enough willing and loving adoptive homes to handle thousands of difficult minority children. Although society will probably not think it can afford to house, feed, and educate these children in group homes, this would appear to be the most humane and indeed the most self-interested thing for society to undertake with them if the alternative is to leave them to fend for themselves and fail, haunting us all for the rest of their lives.

These children need intensive educational environments, and they need good nutrition, physical therapy, and healthcare. One relatively successful school program has used an adult/child ratio of 3:8 (New York Times, 1990a). In order to optimally educate these children, more teachers and aides would have to be hired and trained, and more special education classes would have to be put in place. There is no doubt but that these children are going to be an expensive problem, and the ramifications of the problem go beyond the financial cost. Even the most optimistic results of testing these children have shown that at best they are functioning in the low normal and normal range. If the ultimate effect of intrauterine cocaine exposure is even the minimum that can be hoped for - a small drop in learning ability - this can have a profound effect on society when the numbers of affected individuals are taken into account (Revkin, 1989), estimated by some to be between 1 and 2 percent of all babies currently being born in the U.S. (Rist, 1990). Charles Krauthammer, a columnist for the Washington Post, expressed little hope for the future of these children, likening them to the "subhuman drones incubated under reduced oxygen levels in government-run fetal hatcheries," which were fantasized by author Aldous Huxley in "Brave New World" (Rist, 1990). Saving these children from becoming such drones is vital not just to them but to the society they will live in, and this reclamation could be a difficult assignment.

Although crack reached its epidemic proportions because it is relatively cheap, everything that has to do with the drug is turning out to be costly. Drug enforcement efforts and drug treatment programs are expensive, hospitalization of these children is expensive, and the kind of special education which will likely be required is expensive. In a typical school in Los Angeles, for example, it currently costs $3,500 annually per child in a regular classroom, $9,000 in a special education classroom, and an estimated $15,000 in a classroom with the low teacher-student ratio these children require (New York Times, 1990a). This is a great deal of money, but these children are going to be even more costly if not cared for, potentially flooding mental hospitals and prisons when they become adults.

Writers for some newspapers and magazines have made efforts to inform the public of the extent of the problems anticipated with these children, but this has not been enough. Society must be made aware of the need to stop mothers from using cocaine and of the fact that this cocaine use during pregnancy is not just a crime against the mother, nor even just a crime against the fetus - it is a crime against all of us who must ultimately bear the responsibility for the socialization and education of these children. The public must also be made aware of the need to spend the extra money required for the care and education of cocaine-exposed children. In a hard-pressed economy that has recently appeared to come to the end of the long-term borrowing

against the future which took place during the past decade, it will be hard to convince people that tax dollars will have to be expended on behalf of these children. Providing them with the assistance they need to develop into human beings capable of feeling joy and achievement must be made a priority for both humanitarian and purely practical reasons. If the money is not spent, and these children are not helped, we may realize too late that the problems and social costs grew bigger every year and that society should have saved money by doing without something else. Helping these children now is a sound investment not only in their futures but in the future of our whole society. Additional educational and social programs must be developed and more effective preventative measures must be taken.

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